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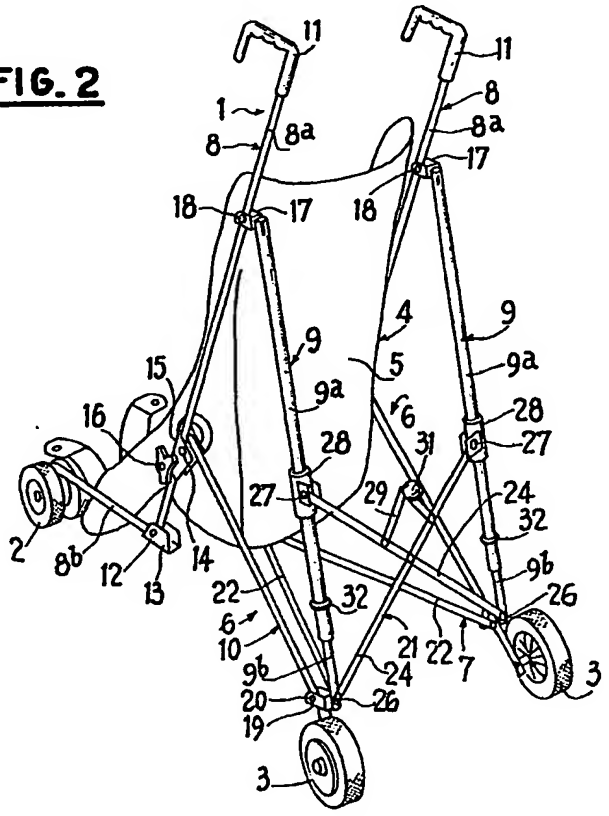
(54) Foldable push-chair

(57) The chassis frame comprises two side chassis assemblies 6, interconnected by a rear linkage 21, each side assembly 6 being constituted by at least one main support element 8 and by a rear upright member 9. Each member 9 is articulated at its lower part to another chassis element 10 and at its upper part, to the support element 8 about a transverse axis 18, fixed in relation to the support element. The upright member 9 is in two sections 9a and 9b, one slidable within the other so that the member 9 has a variable effective length. The rear linkage 21 has a very small height and slides on section 9*a* of the upright member 9 via sleeve 28, and is pivoted at 26 to the lower section 9*b*.

FIG. 2



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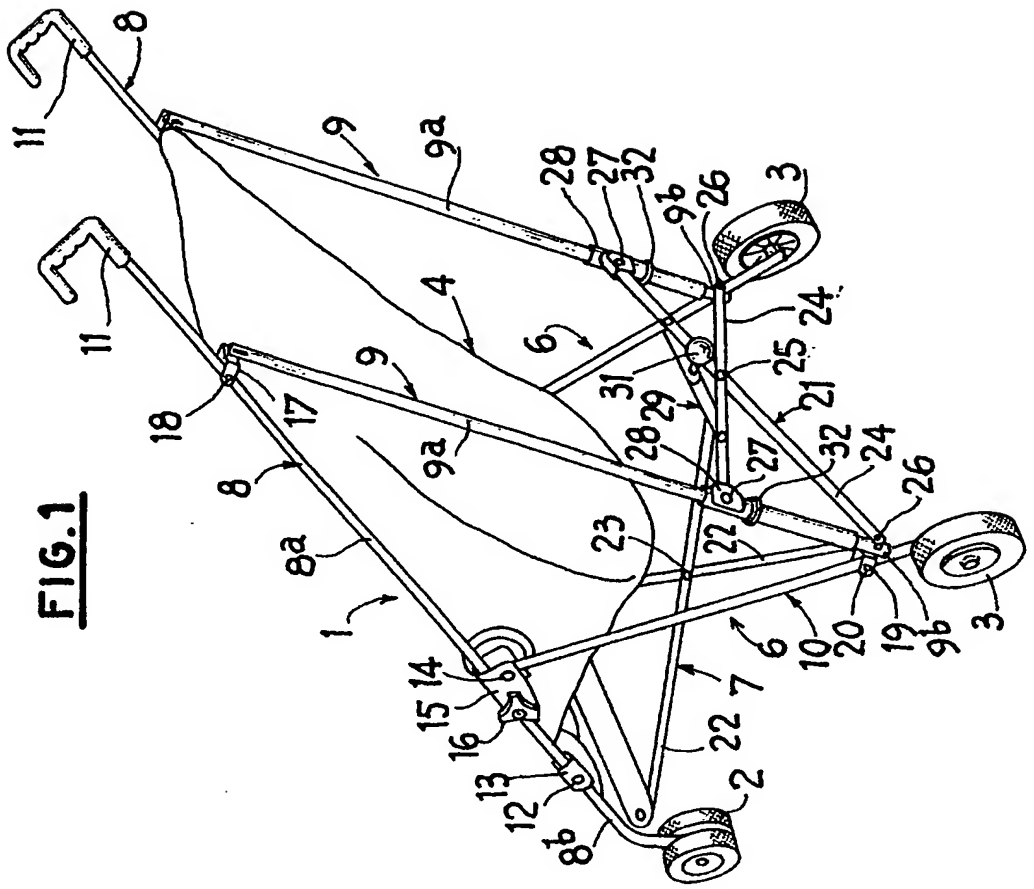

FIG.1

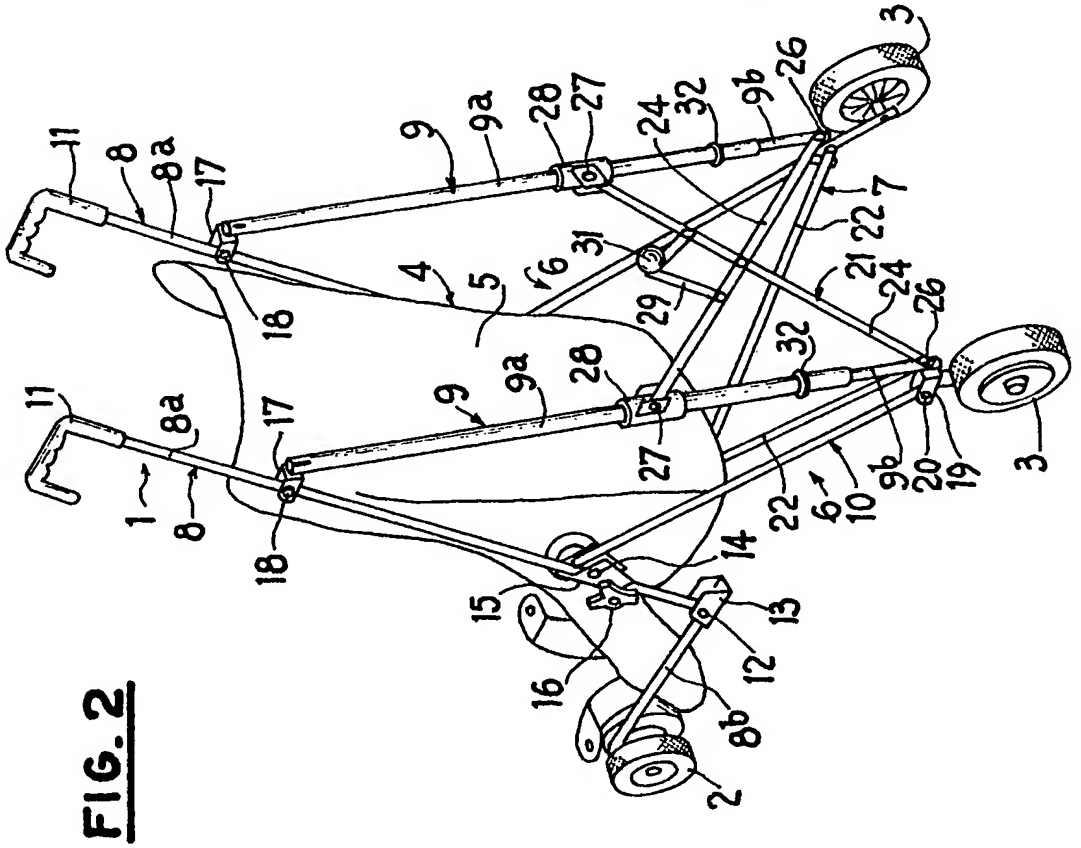

FIG.2

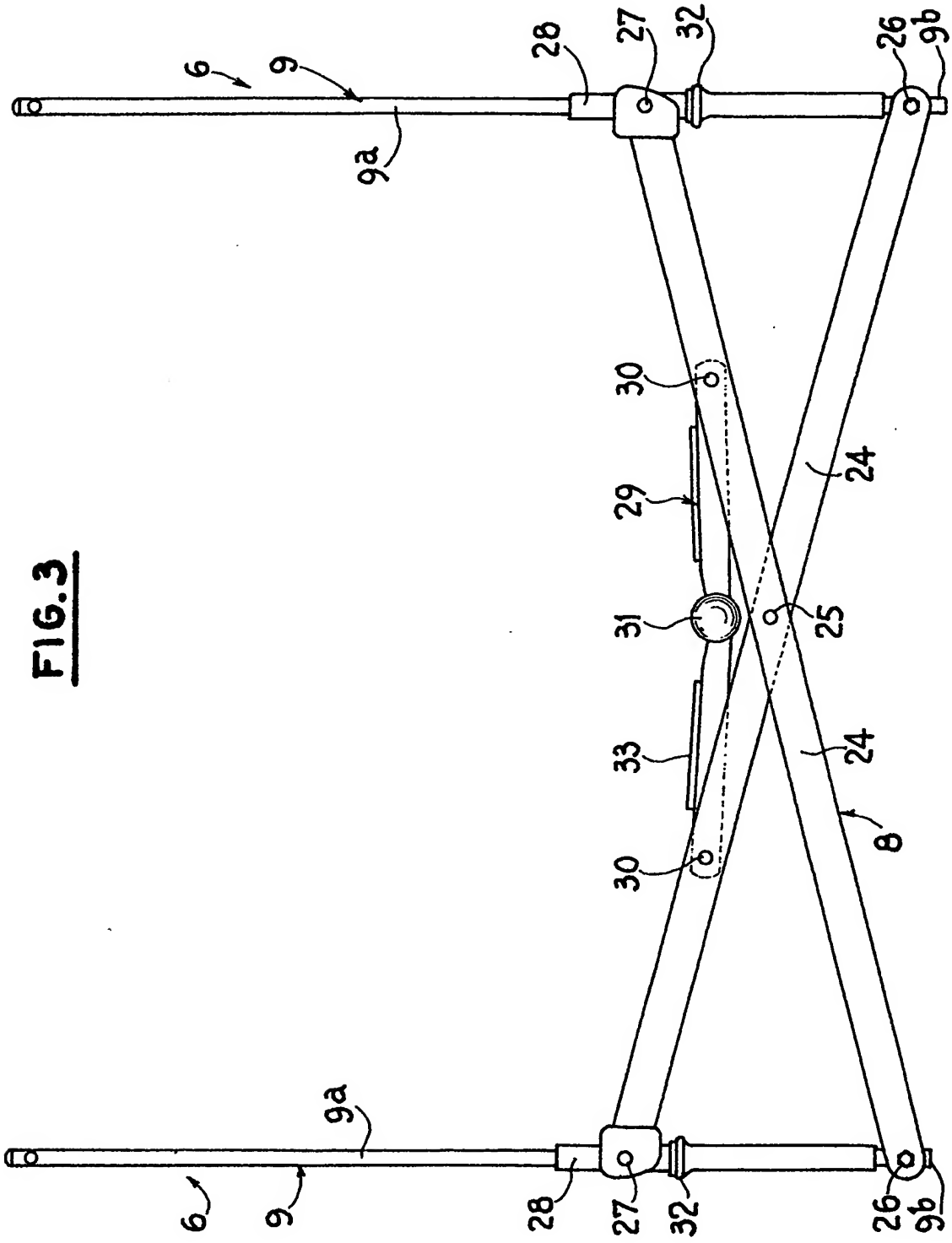

FIG.3

SPECIFICATION

A perambulator of the foldable push-chair type

The invention is concerned with perambulators of the foldable push-chair type, generally called "walking stick push-chairs", which have a chassis which can be folded, mounted on wheels and carrying a seat for the child.

The usual manner of folding the chassis is by bringing together the two side chassis assemblies, articulating the transverse struts, and for each side assembly by folding its elements together.

The three movements, respectively of bringing together the two side chassis assemblies, folding together the elements of each side assembly, and deforming the struts, are coupled together by the action of the transverse struts. In use, manipulating the transverse struts therefore causes, according to the direction of this operation, the folding or the unfolding of the whole of the chassis.

The rigidity and the stability of the chassis in the unfolded, or deployed, position are ensured by a lower transverse strut linkage, which is more or less horizontal, and situated at the level of the wheels, and by a rear transverse strut linkage, situated more or less in a vertical or slightly oblique plane, according to the general structure of the push-chair.

Each transverse strut linkage is constituted by a deformable cross or "X" of which the two identical arms, are, on the one hand, articulated to each other generally at their centres, about an axis perpendicular to their planes, and on the other hand, each, at its extremities, about axes parallel to the central articulation axis, respectively on an element on each of the two side chassis assemblies of the chassis.

The arms of the lower linkage are articulated to the chassis near to the wheels, while the arms of the rear linkage are articulated about axes parallel to the central articulation axis, at their lower extremities, to a chassis element near to each rear wheel. At their upper extremities, according to a known construction, each area of the rear linkage is articulated to a main oblique support element carrying a handle or the like.

The two side chassis assemblies are thus held together and stiffened, at the lower part, by the lower linkage which co-operates therewith at the front and rear, and, at the rear part, by the rear linkage which co-operates therewith at the bottom and at the top.

It is to be noted that, according to this known construction, the rear linkage has to co-operate with the main support elements at their upper parts, in order to ensure a satisfactory stability and rigidity of the chassis. But this solution finishes up with a rear linkage of large dimensions, which extends for a considerable height of the push-chair. This arrangement, in addition to being inelegant, has the inconvenience not only of spoiling the view and the comfort of the child when the seat is placed facing the mother, but also of interfering with the access of the mother to the child.

Attempts have been made to remedy in part these inconveniences by arching the rear linkage towards the mother; but this partial solution, other than being difficult and even more inelegant, does not solve the problems posed by the view of the child and the accessibility of the mother to the child.

The object of the invention is to remedy these inconveniences by proposing a push-chair of the kind described above which, while being rigid and stable in the deployed position and easy to operate, in no way spoils the comfort and the view of the child and gives perfect accessibility of the mother to the child.

According to this invention, a perambulator of the foldable push-chair type comprises a foldable chassis mounted on wheels and carrying a seat or the like, the chassis having two similar side chassis assemblies each comprising at least one main support element and a rear upright member and also having at least one deformable rear transverse strut linkage, each rear upright member is in at least two telescopically-connected sections, the upper section having its upper part articulated to the associated main support element about a transverse axis fixed in relation to said support element, and the lower section having its lower end part articulated to an element of the associated side chassis assembly about a transverse axis, the rear transverse strut linkage being articulated on the two telescopically-connected sections of each upright member.

With such an arrangement, the upper section of each member does not slide on the main support element, which, according to an advantageous characteristic of the invention, enables the zone of connection between the rear transverse linkage and the principal support element to be lowered substantially, thanks to the rigidity and the stability due to the higher connection of the upright.

Preferably, the telescopically-connected sections constituting each upright member are of significantly unequal lengths, the lower section being very considerably shorter so as to be concerned only with the lower part of the push-chair. Preferably, also, this lower section, for the unfolded position of the push-chair, has a useful length of practically zero.

According to an example of construction, each upright member is constituted by an upper tube which receives internally a lower tube of smaller section, sliding almost totally into the upper tube for the unfolded position of the push-chair.

The rear transverse linkage connects the two upright members in a movable way. In a manner known *per se*, it is, as previously indicated, constituted by two arms forming a cross, articulated at its centre, and connecting together each of the two upright members.

According to a preferred method of construction, each arm of this cross is articulated at its upper extremity on a slider or sleeve arranged to slide on the upper section of one of the upright members, while its lower extremity is articulated on the lower part of the other upright member, preferably in the

immediate neighbourhood of the lower extremity of the said lower section. The four axes of articulation of the two arms on the upright members are parallel to the central axis of articulation of the cross.

To increase the rigidity and the stability of the chassis in the unfolded position, a stop is provided on each upright member to hold the associated arm of the cross in its unfolded position, the cross being urged towards this position and against these stops by locking means.

Advantageously, because the rigidity and the stability of the chassis are largely ensured by the fixed axis articulations, the cross is not very high and directly, or by the locking means which it carries, it can constitute a foot-rest for the child.

The invention will be better understood on reading the following description of a specific embodiment thereof, given by way of example only, reference being made to the accompanying drawings, in which:

Figure 1 is a schematic perspective of a push-chair according to the invention, in the unfolded, or deployed, position;

Figure 2 is a view similar to Figure 1, but with the push-chair in the partially unfolded position;

Figure 3 is a partial view in rear elevation showing, for the deployed position of the push-chair, the rear upright members, the rear linkage and the locking means.

The push-chair, represented as a whole in Figures 1 and 2, is of the "walking-stick" type, and is foldable. It comprises a chassis 1 which is mounted on two front wheels 2 and two rear wheels 3, each single or double, and which supports a seat 4 or the like to receive a child.

The preferred application of the invention, but without being limited to it, is to push-chairs of the type in which the seat 4 can be turned to face in the direction of travel, as shown, or to face towards the rear, that is to say, towards the mother; this reversal of the seat is obtained in a known manner, by turning over the seat with respect to the chassis 1. It is just mentioned here that this reversal, according to the design, requires either a reversible seat pocket or hammock 5 or symmetry of the seat, or reversible handles or handle-bars.

The chassis 1 comprises two similar but preferably identical spaced side chassis assemblies 6, connected together and stiffened by a lower transverse linkage 7 and by a rear transverse linkage 21. The two assemblies. 6 are here identical and symmetrical with respect to the vertical median longitudinal plane of the push-chair, so a description will be given for only one.

Each assembly 6 comprises three elements generally of metallic tubing: a main support element 8, a rear upright member 9, and a rear strut 10.

For the deployed position of the push-chair (Figure 1), the support element 8 is straight, and extends from the rear top of the push-chair to the bottom front part. At its rear top part, it carries a handle 11, while at its curved front bottom part, it carries the associated front wheel 2.

To enable the push-chair to be folded, the support element 8 is in two sections 8a and 8b, the upper section 8a carrying the handle 11 and the lower section 8b carrying the wheel 2. These two sections 8a, 8b are articulated together by a transverse pivot 12 (Figure 2) fixed to each section. A one-sided channel-shaped clip 13, fixed to the lower section 8b, is arranged to co-operate with the lower extremity of the section 8a for the rigidity of the support element 8 in the unfolded position.

The rear strut 10 is inclined in the opposite sense to that of the main support element 8 but more or less at the same angle. At its rear lower extremity, it carries the associated rear wheel 3, while its upper front extremity is articulated, by a pivot 14 with a transverse axis, to a clip 15 fixed on the upper section 8a of the support element 8.

The seat 4 is suspended from the chassis 1 by two pins (not visible in the drawings) held by the clips 15 and suitably locked in the chosen angular position of the seat by buttons 16, whether the seat is turned towards the front or the back.

The rear upright member 9 lies in a transverse plane which is slightly inclined to the vertical. Its upper extremity is fastened to a clip 17 which receives the support element 8, a short distance from the handle 11. The clip 17 is articulated to the support element 8 by a transverse pivot 18, fixed in relation to said support element. At its lower extremity, the upright member 9 is fastened to a clip 19 which receives the rear strut 10, in the immediate neighbourhood of the mounting for the wheel 3. The clip 19 is articulated to the rear strut 10 about a transverse pivot 20 fixed in relation to the strut.

It will be understood from the above description, that the physical triangle of members having apices constituted by the pivots 14, 18 and 20 has, for the unfolded position of Figure 1, sides of fixed, invariable length, which confers on each side assembly 6 of the chassis a remarkable rigidity and stability in its plane.

The connection of the two side assemblies 6 is effected, as previously indicated, by the lower linkage 7 and rear linkage 21, each in the form of a cross, otherwise referred to as an "X" or scissors linkage.

The lower linkage 7 is situated below the seat. It is constituted by two identical diagonal arms 22, articulated together at their centres, by a pivot 23 the axis of which is perpendicular to the plane of the arms. The front extremities of the arms 22 are articulated to the respective lower extremities of the support elements 8, for example by a clip with two pivots having orthogonal axes enabling the linkage 7 to pivot its plane and the lower section 8b of the support element to rotate in the corresponding vertical plane of the side chassis assembly 6. In the same way, the rear extremities of the arms 22 are articulated to the lower extremities of the respective rear struts 10, for example by clips, such as clip 19, with two orthogonal pivots enabling the same movements.

The rear linkage 21 is situated more or less in the transverse plane of the rear uprights 9. It is

also constituted by two identical diagonal arms 24, articulated together at their centres by a pivot 25 the axis of which is perpendicular to the plane of the cross.

The linkage 21 acts by the extremities of its arms 24 on the rear upright members which the linkage prevents from approaching each other by a locking means when the push-chair is in its unfolded position as will be seen later.

The lower extremities of the arms 24 of the linkage 21 are articulated by pivots 26, with the axes of which are parallel to that of pivot 25, to the lower extremity of the respective upright members 9, while the upper extremities of the arms 24 are articulated by pivots 27, the axes of which are also parallel to that of pivot 25, each pivot being carried by a slider 28 able to slide freely on the corresponding upright member 9.

A means of locking the linkage 21, and in general the whole of the chassis 1 in a deployed position, is provided to act between the arms 24. It is, for example, constituted by a two-armed brace 29, the arms of which are articulated at 30 to the arms 24 or to the sliders 28 and of which the central pivot carries a knob 31 for gripping and operating. The upper surface of the arms 24 and/or the brace can carry a fixed horizontal plate 33 acting as a foot-rest and as a grip for the operation of unfolding and folding the push-chair.

When the brace 29 is opened to the maximum, it urges the sliders 28 downwards, against the fixed stops 32 provided on the upright members 9.

When the push-chair is to be folded, the locking means of the linkage 21 is released and the linkage 21 is forced to close manually; the upright members 9 are then urged together by the linkage 21 which closes by sliding the sliders 28 on the upright members 9; the two side chassis assemblies 6 are thus drawn together, which pivots the lower linkage 7 which also closes, causing an increase in the distance between the front wheels 2 and the back wheels 3; the support elements 8 are manually forced to articulate about their respective pivots 12, in order to form an angle of less than 180° directed forwards; the handles 11 swing towards the front.

Because the articulations 18 of the rear uprights and the articulations 14 of the rear struts 10 on the support elements 8 are in a fixed position on these latter, these movements (which have to be continued until, for each side chassis assembly, the constituent elements 8a, 8b, 9 and 10 are in contact with one another, and the two assemblies 6 so folded are brought against one another, imprisoning and compressing between them the flexible seat 4 and the linkages 7 and 21) are only possible if, in folding, the length of the upright members 9 between the articulations 18 and 20 is increased.

For this reason, each upright member 9 is at least, and preferably, in two sections 9a and 9b joined telescopically, the upper section 9a carrying the clip 17 and the lower section carrying the clip 19. By virtue of the sliding permitted by this telescopic connection, the triangle 14, 18, 20 may have one side of a variable length, constituted by the upright member 9, the length increasing during folding.

The sections 9a and 9b are of most unequal lengths, the section 9a being much longer than the section 9b. Preferably, the respective lengths are such that, for the unfolded position (Figure 1), the active length of the lower section 9b is practically zero.

It is of advantage for the upper section 9a to be constituted by a tube of a larger diameter than the tube constituting the lower section 9b, which may then enter the tube 9a.

Because the articulations 18 are fixed on the main support elements 8, it is no longer necessary to have a very high rear linkage 21.

According to another feature of the invention in this embodiment, the linkage 21 extends to a small height from the bottom of the chassis 1, and preferably is at a lower level than the lowest part of the seat 4.

For this reason, according to still another of the invention, the linkage 21 and/or the locking device can with advantage form a foot-rest for the child when the seat is in the position for facing the mother.

Each side chassis assembly 6 can be constituted in metallic tubing, while the linkages 7 and 21, with the lock 29 can, be in flat metal strips. The side chassis assemblies 6, and/or the linkages 7 and 21 with the lock 29 can, however, be made from plastics.

CLAIMS

1. A perambulator of the foldable push-chair type comprises a foldable chassis mounted on wheels and carrying a seat or the like, the chassis having two similar side chassis assemblies each comprising at least one main support element and a rear upright member and also having at least one deformable rear transverse strut linkage, each rear upright member is in at least two telescopically-connected sections, the upper section having its upper part articulated to the associated main support element about a transverse axis fixed in relation to said support element, and the lower section having its lower end part articulated to an element of the associated side chassis assembly about a transverse axis, the rear transverse strut linkage being articulated on the two telescopically-connected sections of each upright member.

2. A perambulator according to claim 1, wherein the transverse rear linkage interconnects the two rear upright members while remaining entirely in the lower part of the chassis for when the perambulator is in the unfolded position.

3. A perambulator according to claim 1 or claim 2, wherein the transverse rear linkage is situated at a level lower than that of the lowest part of the seat when in the unfolded position.

4. A perambulator according to any of claims 1 to 3, wherein the transverse rear linkage and/or a means of locking that linkage in the unfolded position comprises a foot-rest for a carried child when the seat is in the position for facing a perambulator

pusher, such a foot-rest being provided preferably by a horizontal plate which may also serve equally as a gripping device.

5. A perambulator according to any of claims 1 to 4, wherein each of the rear upright members has a stop against which the tranverse rear linkage is urged by means of a locking mechanism, when in the unfolded position.

6. A perambulator according to any of claims 1 to 5, wherein the transverse linkage comprises an articulated cross of which each arm is connected obliquely to the rear upright members, the lower extremities of the arms being articulated to the lower sections of the upright members, and the upper extremities of the arms being articulated each one to a respective slider arranged to be displaceable on the upper section of the corresponding upright member.

7. A perambulator according to any of the claims 1 to 6, wherein the upper and the lower sections of each upright member are of significantly unequal lengths, the lower section being shorter than the upper section.

8. A perambulator according to claim 7, wherein for the unfolded position, the lower section has a useful length of practically zero.

9. A perambulator according to any of claims 1 to 8, wherein each rear upright member is constituted by two tubes of different diameters, one sliding within the other.

10. A perambulator according to any of claims 1 to 9, wherein the two side chassis assemblies are connected at their lower parts by an articulated linkage, each side assembly comprising: a main inclined support element carrying at its rear upper extremity a handle and at its front lower extremity a front wheel the support element being in two articulated sections, a rear inclined strut carrying at its lower rear extremity a rear wheel and being, at its front upper extremity, articulated to a clip, and a rear upright member articulated at its lower extremity on the rear strut.

11. A perambulator according to claim 10, wherein the clip to which the rear inclined strut is pivoted is fixed to the main support element, and the rear strut, one section of the main support element and the rear upright member together constitute a triangle which can be closed together, the upright member being of variable length to permit such closing action.

12. A perambulator of the folding push-chair kind and substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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